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LNG technical REVIEW

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New direct LNG regas procedures are developed

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Efficiency is in demand the world over. Currently volatile and, in the long term, rising fossil fuel prices, as well as the likely introduction of carbon emission trading schemes, put more pressure on operators of industrial plants.

To handle these challenges natural gas becomes the fuel of choice as a reliable and low-carbon emission fuel source. This directly affects the LNG demand and processing facilities being build all over the world prove this trend.

However, natural gas and LNG prices are likely to rise with global demand increasing. Therefore its use has to be as efficient as possible throughout the whole supply chain.

SOLUTION

The following article presents a solution to increase the efficiency of LNG regasification systems by avoiding an intermediate fluid (indirect cycle) between the heat source and LNG.

Currently, several LNG regasification systems exist, e.g. fired heaters, submerged vaporizers, heating towers and gas turbine cogeneration. All these systems use an intermediate fluid (usually water) to regasify LNG.

This might have certain benefits, however energy costs becoming more and more important alternative systems challenge existing applications. To reduce natural gas consumption and carbon emissions ERK and Gasco suggest the direct regasification of LNG inside a heater, avoiding intermediate fluids.

By avoiding the intermediate cycle process efficiency rises due to the avoidance of an extra heat exchanger, fluid transport losses and reduced pumping capacity. Accumulating these single losses ERK/Gasco believes that the efficiency of the LNG regasification process can be raised by 10-15% using a direct regasification system.

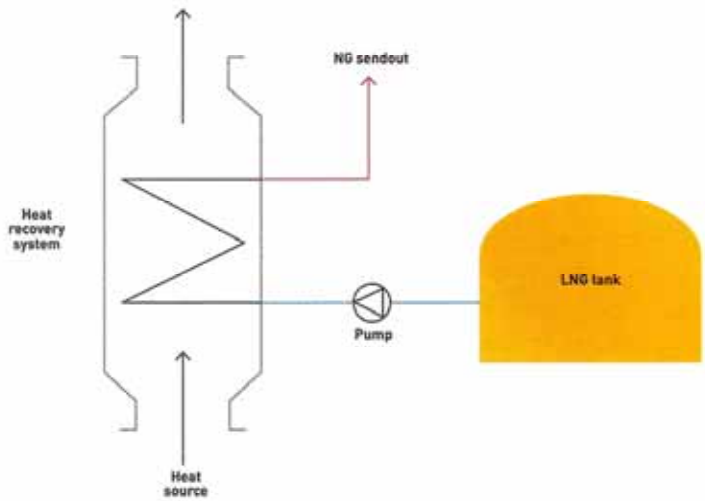

Figure 1: Direct regasification system

REGASIFICATION

Direct regasification systems feed the LNG at -245°F from the storage tank straight to a heater (see figure 1). The heater uses the hot flue gases from a gas turbine, coal or biomass combustion etc. to turn LNG into natural gas (NG) at 45°F.

Depending on the space available the direct heater could be a horizontal or vertical design (see Figure 2).

Horizontal designs are recommended if sufficient space is available as investment and maintenance costs are lower. Different heating surfaces are required to regasify LNG. The heating surface tube bundles closest to the heat source will be the smallest due to the high exhaust temperature.

With temperature differences decreasing between the exhaust and LNG downstream heating surfaces become larger.

To avoid safety risks the heater has to be designed accordingly, taking the explosive working fluid, significant temperature differences, appropriate material etc into account. LNG/NG leakages possess the greatest safety risk as contact with the hot exhaust gases might cause explosions.

To prevent such a scenario the heater has to be designed to avoid LNG/NG leakages and withstand a possible explosion. ERK has long-term experience with explosion resistance as waste fired boilers have to cope with explosions from unexpected materials, e.g. oxygen bottles and hand grenades.

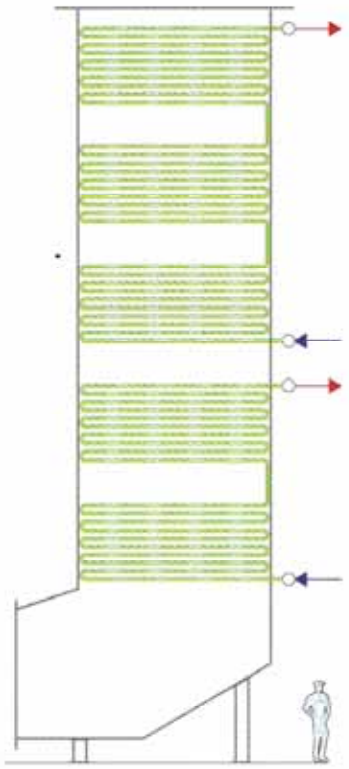

Figure 2: Vertical heater design

Also ERK and Gasco have long-term experience with flammable working fluids due to several hundred natural gas and thermal oil heater references (thermal capacities 1-50 MW). In 2007 a natural gas fired heater to heat a flammable chemical to supercritical parameters went into operation. Therefore the know-how to design a direct LNG regasifier is available. ■